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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/814,873
Filing Date: March 31, 2004
Appellant(s): REMINGTON, MICHAEL P.

Mark A. Hixon
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 07/02/2008 appealing from the Office action mailed 11/02/2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1 – 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ye (United States Patent 6,106,892) in view of Neuman, et al (United States Patent 5,599,387, hereafter Neuman).

Regarding Claim 1, Ye teaches a process for depositing a silica coating upon a heated glass substrate, comprising: a) providing a heated glass substrate having a surface upon which the coating is to be deposited (see Column 7, lines 1 – 5); and b) directing a precursor mixture comprising a silane and a phosphorous compound toward and along the surface to be coated, and reacting the mixture at or near the surface to form a silica coating on the surface of the glass substrate (see Column 7, lines 6 – 16). Ye also teaches that the precursor mixture further comprises an oxygen source (see Column 2, lines 46 – 49), a radical scavenger (see again Column 2, lines 46 – 49;

applicant discloses and claims that ethylene is a radical scavenger), and an inert carrier gas (see Column 3, lines 7 – 8, and Table 1 of Ye).

Ye does not teach that the phosphorous compound is a phosphorous (V) compound. Ye states, in Column 3, lines 8 – 10, that "Where used, the accelerant, a phosphite … ester, was injected into the heated gaseous mixture …" The accelerant used by Ye, according to Table 1, is triethylphosphite (TEP). Therefore, it is clear from the language of the Specification that the phosphorous compound (phosphorous ester) claimed by Ye in Claim 1 is an accelerant. Neuman teaches, in Column 13, lines 60 – 65, and Column 14, lines 4 – 9, 15 – 19, 29 – 32, 53 – 55, and 58 – 59, that "Accelerants that can be used in the practice of the invention to increase the deposition rate of silicon oxide ***alone or in combination with another oxide***, for example, tin oxide … can be defined as follows: … (4) Compounds of … phosphorous … having the following structural formulae: $(R')_3P$, … $(R')_3P=O$, … $(R')_5P$, … wherein … R' … (are) selected from … alkoxide(s) having … preferably 1 to 4 carbon atoms, such as – $OCH_2CH_2CH_3$ … examples of which compounds include but are not limited to triethylphosphite." $(R')_3P=O$ and $(R')_5P$ are pentavalent, phosphorous (V) compounds that Neuman teaches may be used as accelerants in lieu of triethylphosphite. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the present invention to have modified the process taught by Ye by using the phosphorous (V) compounds disclosed in Neuman as the accelerant instead of triethylphosphite, as Neuman teaches that all such accelerants are so capable.

Regarding Claims 2 and 3, the same analysis holds true. Ye does not teach that a phosphorous (V) ester or that triethylphosphate may be used as accelerants. However, Neuman teaches that just such compounds may be used as accelerants (e.g., $(R')_3P=O$, wherein R' = $-OCH_2CH_3$).

Regarding Claim 4, Ye teaches the process of Claim 1, wherein the silane is monosilane (see Table 1 and Claim 7). Regarding Claim 5, as discussed, Ye teaches that the inert carrier comprises nitrogen. Regarding Claim 6, as discussed, Ye teaches that ethylene is the radical scavenger.

2. Claims 7, 8, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ye in view of Neuman, and further in view of Soubeyrand (United States Patent 5,798,142).

Regarding Claim 7, Ye does not teach that the oxygen containing material/source is oxygen gas. However, Soubeyrand teaches that "pure oxygen may be utilized as the precursor component," (Column 5, line 57) in a silica deposition process in which "silane, a radical scavenger gas, oxygen and an inert carrier gas" (Claim 1 of Soubeyrand) are used, and specifically "wherein the radical scavenger gas is ethylene" (Claim 8 of Soubeyrand). Moreover, Soubeyrand teaches, in Column 5, lines 6 – 10, that "the precursors of the present invention also provide a coating having better uniformity and a lower refractive index, are less sensitive to glass temperature, and have a much higher silane conversion efficiency than the silane/ethylene/acetone system." Because Soubeyrand teaches that oxygen is a superior oxygen source for the deposition of silica on glass than other oxygen-containing source gases (i.e., acetone or

carbon dioxide), and also demonstrates that oxygen has been successfully used as the oxygen source gas in a silica deposition process that utilizes a gas mixture further comprising monosilane, ethylene, and an inert carrier gas (nitrogen), it would have been obvious to one having ordinary skill in the art at the time of the present invention to have modified the method taught by Ye in view of Neuman by using oxygen as the oxygen source to have obtained these advantages.

Regarding Claim 8, Ye does not teach the exact combination of ranges of compositions of silane, oxygen, ethylene, and triethylphosphate as claimed in the current Application. Ye does teach, in Example 1 (see Table 1), that 1.2% silane, 15.2% oxygen source gas, 22.8% ethylene, and 0.01% triethylphosphite accelerant is one successful such combination. It has been held that, where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (*In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955), see also MPEP 2144.05 II-A), and, furthermore, that discovering an optimum value of a result effective variable involves only routine skill in the art (*In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980), see also MPEP 2144.05 II-B). Therefore, it would have been obvious and would have involved only routine experimentation to one having ordinary skill in the art at the time of the present invention to have utilized and optimized the ranges taught by Ye in view of Neuman and Soubeyrand. (See also MPEP 2144.05 II, which states that, generally, differences in concentration will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration is critical.)

Regarding Claim 13, Ye in view of Neuman does not teach that oxygen should be used as oxygen source gas. However, as discussed for Claim 7, Soubeyrand teaches that oxygen may successfully be used as the oxygen sources gas in a silica deposition process otherwise utilizing monosilane, ethylene, and nitrogen, and Neuman teaches that triethylphosphate may successfully be used as an accelerant in lieu of triethylphosphite. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the present invention to have modified the method taught by Ye in view of Neuman by using oxygen as the oxygen containing material to have obtained the advantages taught by Soubeyrand.

(10) Response to Argument

A) Applicant argues that the combination of Ye and Neuman is improper, because Applicant believes that Neuman teaches that the use of Phosphorous (V) compounds as accelerants "is shown only in conjunction of the deposition of silicon + another metal, and not for the production of silica alone." Applicant acknowledges that Neuman teaches, in Column 13, lines 61 – 65, that "accelerants can be used in the practice of the invention to increase the deposition rate of ***silicon oxide alone*** or in combination with another oxide, for example, tin oxide or other metal-containing compound," but submits that Neuman does not actually teach the use of this accelerant with silicon oxide alone but is instead consistent in showing layers of silicon oxide in conjunction with another metal. The examiner agrees that Neuman teaches the use of the accelerant in forming mixed oxides such as silicon oxide and tin oxide, but Neuman

also suggests on several occasions throughout the specification that the accelerants are used to increase the deposition rate of silicon oxide alone. The Abstract suggests that these accelerants are used to deposit silicon oxide films alone since it is only stated in the last sentence that alternatively another metal oxide may be deposited. Also, at Col. 13, lines 15-20 and as stated above at lines 60-65, Neuman states that the silicon precursors can be used **alone** or in an admixture to form a **single oxide** or a mixed oxide. Claims 1-13 disclose using a precursor mixture of a silicon-containing compound, an oxygen-containing compound, and an accelerant to deposit a silicon oxide film. These claims do not require that a mixed oxide be formed. Therefore, contrary to Applicant's argument, Neuman does show the use of a Phosphorous V compound in the deposition of a silica layer, and therefore Claim 1 is obvious over Ye in view of Neuman.

Applicant further argues that Phosphorous (V) compounds are only one of a "laundry list" of potential accelerants taught by Neuman, that there is no suggestion as to any particular utility in the selection of a Phosphorous (V) compound, and that "there is nothing in the Neuman reference to determine the benefits of the use of that particular compound out of the list of all of the compounds disclosed therein." This argument is not persuasive. Neuman teaches not a generic 'laundry list,' but, instead, a detailed list of accelerants known in the silica deposition art, and specifically "compounds of nitrogen, phosphorous, boron, sulfur, and selenium" (see Column 14, lines 4 and 5). Neuman expressly teaches in Columns 13 and 14 that Phosphorous (V) compounds, along with phosphorous (III) compounds (specifically triethylphosphite), are operable as

accelerants to increase the rate of deposition of silicon oxide alone. An express teaching may be based on a statement in the prior art reference such as an art recognized equivalence. See *Merck & Co. v. Biocraft Labs.*, 874 F.2d 804, 807, 10 USPQ2d 1843, 1846 (Fed. Cir. 1989), and MPEP 2144.08. Moreover, the selection of a known material based on its suitability for its intended use supports a *prima facie* obviousness determination. See *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945), and MPEP 2144.07.

Applicant finally argues that the use of a Phosphorous (V) compound has been found to have "especially beneficial results." However, this is also not persuasive. Applicant asserts that Paragraphs [0010] and [0011] of the Specification demonstrate such unexpected results. However, Paragraph [0010] merely states that "the use of a phosphorous (V) compound, specifically triethylphosphate, has been found to enhance the deposition of silica *from known silane/oxygen/radical scavenger deposition systems*," and not from silane/oxygen/radical scavenger/accelerant systems known in the art. That is, there is no evidence in the Specification that Phosphorous (V) compounds such as triethylphosphate actually provide unexpected results over the general class of accelerants known in the silica deposition art. The arguments of counsel cannot take the place of evidence in the record (see MPEP 716.01(c)). Because the Specification does not provide such evidence, evidence must be in the form of an affidavit or declaration (see MPEP 716.02(g)), and an affidavit or declaration must compare the claimed subject matter with the closest prior art to be effective to rebut a *prima facie* case of obviousness (see MPEP 716.02(e)).

B) Applicant's arguments have been addressed in section A above.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Elizabeth A Burkhart/
Examiner, Art Unit 1792

Conferees:

/Timothy H Meeks/

Supervisory Patent Examiner, Art Unit 1792

/Gregory L Mills/

Supervisory Patent Examiner, Art Unit 1700